Inland Waterways
Future Utilization & Optimal Investment Strategy

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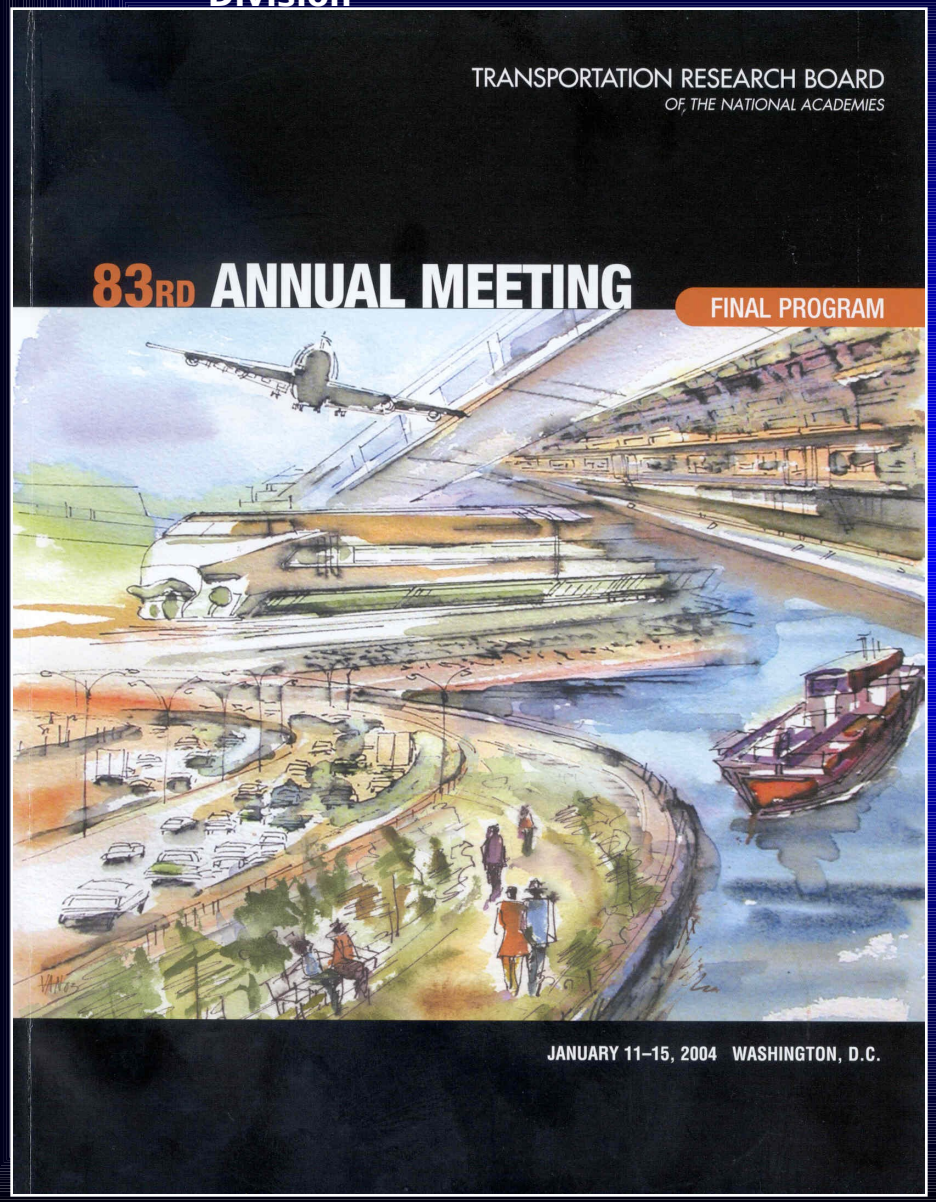


TRB Session 334

Economics of Inland Waterway Investment

- **Inland Waterways: Future Utilization and Optimal Investment Strategy**
  Langdon, CELRH-NC

- **Economic Foundations of Ohio River Navigation Investment Model**
  Curlee, Oak Ridge National Laboratory

- **Willingness to Pay for Water Transportation in the Ohio River Basin**
  Bray, Tennessee Valley Authority

- **System Investment Plan as a Tool in Adaptive Management**
  Canter, University of Oklahoma

http://trb.org

Transportation Research Record, Journal of the TRB.

FUTURE UTILIZATION AND OPTIMAL INVESTMENT STRATEGY

System Investment Plan (SIP)

- Benefit-Cost Analysis of a potential investment (or investments)
- Optimal what, where and when

"Toto, I've a feeling we're not in Kansas anymore."

Dorothy, The Wizard of OZ (1939)

Ohio River Mainstem Systems Study (ORMSS)

- 20 locks & dams, 189 components
- 8,000 unique O-D-C movements
  - – no lock stands in isolation
- Five Traffic Forecast Scenarios
- 50 to 70 Year Planning Horizon

ORNIM DEVELOPMENT

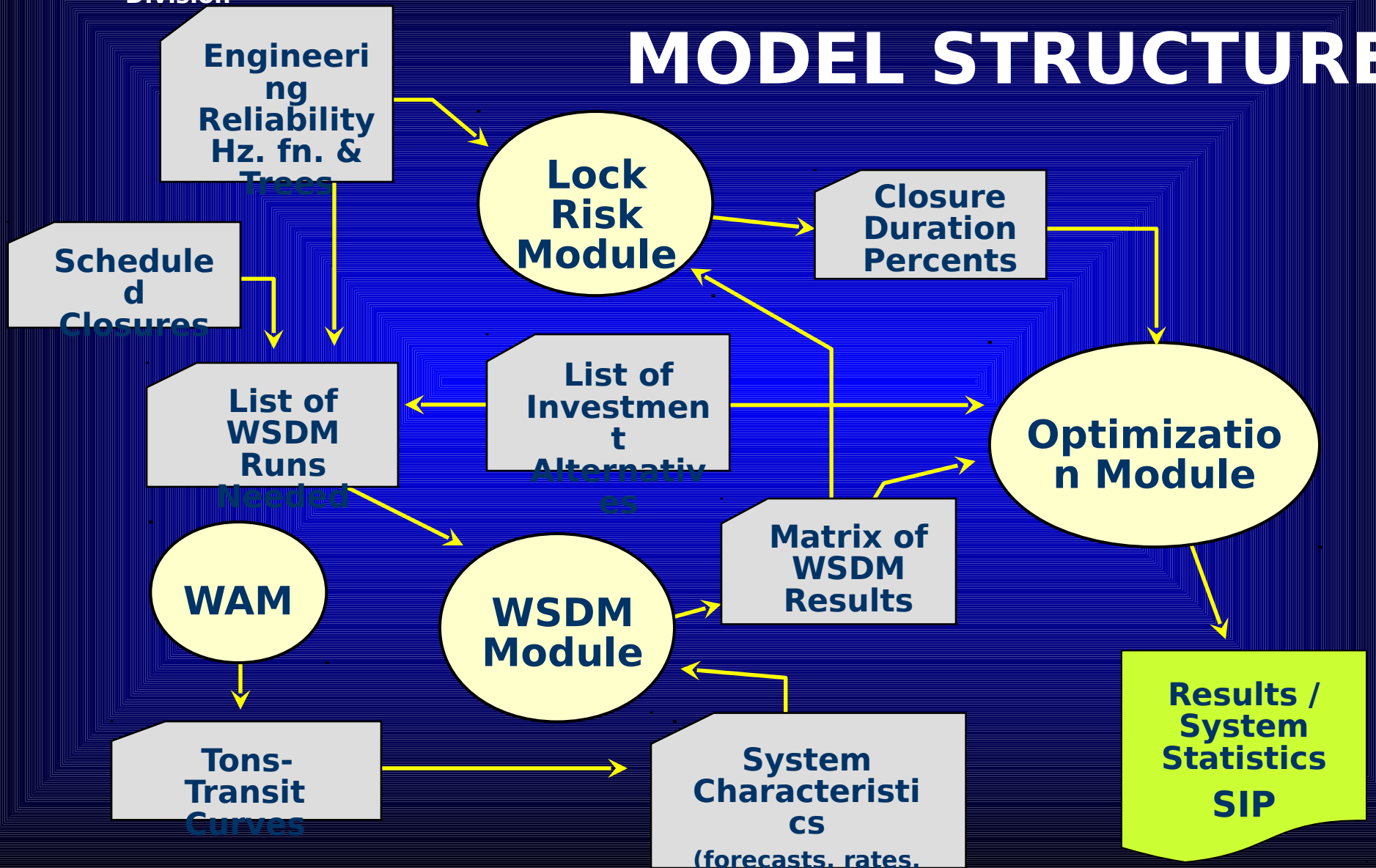
- **Waterway Analysis & Flotilla Models (mid-70s)**
- **Flotilla ⇨ Resource Requirements Model (1977)**
- **+ Marginal Economic Analysis Model (1980)**
- **Marginal Economic Analysis ⇨ Equilibrium Model (mid-80s) a.k.a. TC/EQ model**
- **+ Life Cycle Lock Model (mid-90s)**

MODEL STRUCTURE

- Waterway Analysis Model
- Waterway Supply & Demand Module
- Lock Risk Module
- Optimization Module
- Navigation Predictive Analysis Technique (NAVPAT) Model

ORNIM

MODEL STRUCTURE



1st Model Calibration / Validation = Analysis Pre-processing

Developing the Shipping Plan

- O-D Empty Barge Flows
- O-D Tow Size (BPT)
- O-D Tow Boat Size (HP)
- O-D Re-fleeting Points

2nd INVESTMENT OPTIMIZATION

- **Nonstructural / Low Capital Measures**
  - tow haulage, wall extensions, cut-limits etc.
- **Component Maintenance**
  - component fix-as-fail vs. scheduled replacement vs. major rehabilitation
- **Construction Alternatives**
- **Congestion Fee Analysis**

SUMMARY – ORNIM ADVANTAGES

- **Integrates engineering, environmental and economic data**
- **Flexible Structure**
  - **modular design & relational db structure**
- **ORNIM Automatically**
  - **calibrates to historic data**
  - **optimizes investment permutations (SIP)**
- **Tool for Adaptive Management**

QUESTIONS?